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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/086,696	03/04/2002	Fumirou Abe	0826.1801	2816
21171	7590	05/09/2005	EXAMINER	
STAAS & HALSEY LLP SUITE 700 1201 NEW YORK AVENUE, N.W. WASHINGTON, DC 20005			DODDS, HAROLD E	
			ART UNIT	PAPER NUMBER
			2167	

DATE MAILED: 05/09/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	<b>Application No.</b>	<b>Applicant(s)</b>	
	10/086,696	ABE ET AL.	
	<b>Examiner</b> Harold E. Dodds, Jr.	<b>Art Unit</b> 2167	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

#### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

1) Responsive to communication(s) filed on 15 February 2005.

2a) This action is **FINAL**.                                    2b) This action is non-final.

3) Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

4) Claim(s) 1-13 is/are pending in the application.

4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.

5) Claim(s) \_\_\_\_\_ is/are allowed.

6) Claim(s) 1-13 is/are rejected.

7) Claim(s) \_\_\_\_\_ is/are objected to.

8) Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

9) The specification is objected to by the Examiner.

10) The drawing(s) filed on \_\_\_\_\_ is/are: a) accepted or b) objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).  
11) The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

12) Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a) All    b) Some \* c) None of:  
 1. Certified copies of the priority documents have been received.  
 2. Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.  
 3. Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

1) Notice of References Cited (PTO-892)  
 2) Notice of Draftsperson's Patent Drawing Review (PTO-948)  
 3) Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
 Paper No(s)/Mail Date \_\_\_\_\_.

4) Interview Summary (PTO-413)  
 Paper No(s)/Mail Date. \_\_\_\_\_.  
 5) Notice of Informal Patent Application (PTO-152)  
 6) Other: \_\_\_\_\_.

**DETAILED ACTION**

***Claim Rejections - 35 USC § 103***

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

2. Claims 1-5, 10, and 13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Shimura et al. (U.S. Patent No. 5,138,669) and Burkhard (U.S. Patent No. 5,924,091).

3. Shimura renders obvious independent claims 1-3 and 13 by the following:  
“...an automaton generating step of generating an automaton...” at col. 7, lines 45-50.  
“...for receiving a character string...” at col. 7, lines 21-35.  
“...with a final transition state...” at col. 15, lines 52-64.  
“...by scanning the automaton...” at col. 3, lines 66-68 and col. 4, lines 1-6.

Shimura does not teach the use of sort keys, record identifiers, order value tuples, and arranging records in either ascending or descending order.

4. However, Burkhard teaches the use of sort keys, record identifiers, order value tuples, and arranging records in either ascending or descending order as follows:

“...of a sort key item of each record...” at col. 9, line 50-55 and col. 7, lines 58-59.

“...and for associating a record identifier...” at col. 7, lines 58-59.

“...and an order value tuple generating step of generating an order value tuple...” at col. 35, lines 12-14, col. 7, lines 54-57, and col. 7, lines 20-22.

“...which is a set of a record identifier of the record...” at col. 7, lines 54-57.

“...and an order value which is obtained by arranging the records in an ascending/ descending order...” at col. 7, lines 54-57 and col. 9, lines 50-55.

It would have been obvious to one of ordinary skill at the time of the invention to combine Burkhard with Shimura to provide sort keys and record identifiers in order to allow the keys of records to be sorted and to minimize the number of record reads for each record. Likewise, it would have been obvious to one of ordinary skill at the time of the invention to combine Burkhard with Shimura to provide order value tuples in order to provide increased flexibility in the definition of sort keys. Finally, it would have been obvious to one of ordinary skill at the time of the invention to combine Burkhard with Shimura to allow arranging records in either ascending or descending order in order to provide flexibility in the definition for sequential ordering of records and gain more user acceptability of the system. Shimura and Burkhard teach the use of related systems. They teach the use of computers, the use of databases, the sorting of data, the use of

character strings, and the use of keys. Shimura provides generating automatons for receiving character strings and Burkhard provides sort keys, record identifiers, order value tuples, and arranging records in either ascending or descending order.

5. As per claim 4, the "...computer-readable storage medium storing the program..." is taught by Shimura in Fig. 71.

6. As per claim 5, the "...are a plurality of sort key items..." is taught by Burkhard at col. 9, lines 50-55, the "...and said order value tuple..." is taught by Burkhard at col. 7, lines 54-57 and col. 7, lines 20-22, and the "...is a set of a plurality of order values and a record identifier..." is taught by Burkhard at col. 7, lines 54-59.

7. As per claim 10, the "...record identifier setting step of recording a tuple..." is taught by Burkhard at col. 7, lines 58-59 and col. 7, lines 20-22, the "...for association between a starting address of a record..." is taught by Burkhard at col. 24, lines 12-27 and col. 7, lines 58-59, the "...and a record identifier for identification of the record..." is taught by Burkhard at col. 7, lines 58-59, the "...for each record read..." is taught by Burkhard at col. 7, lines 46-49, and the "...from input data..." is taught by Shimura at col. 4, lines 18-22.

8. Claims 6-8 and 12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Shimura and Burkhard as applied to claims above, and further in view of Lee et al. (U.S. Patent No. 5,148,541).

As per claims 6 and 12, the "...on which the order value tuples..." is taught by Burkhardt at col. 7, lines 54-57 and col. 7, lines 20-22, but the "...sort table generating step of generating a sort table..." and the "...are arranged in a predetermined order..." are not taught by either Shimura or Burkhardt.

However Lee teaches the use of sort tables and a predetermined order as follows:

"...FIG. 1B depicts one sort encoding table 24..." at col. 8, line 38.

"...The predetermined criteria includes a master alphabetical sort order for all the languages supported by a multilingual character set and used in the database..." at col. 6, lines 13-16.

It would have been obvious to one of ordinary skill at the time of the invention to combine Lee with Shimura and Burkhardt to provide sort tables in order to provide for a table look-up capability and expedite the access to the records. Likewise, it would have been obvious to one of ordinary skill at the time of the invention to combine Lee with Shimura and Burkhardt to provide a predetermined order of the values in the tables in order to provide increased flexibility in the definition of sort keys. Shimura, Burkhardt, and Lee teach the use of related systems. They teach the use of computers, the use of databases, the sorting of data, the use of character strings, and the use of keys and Burkhardt and Lee teach the use of records. Shimura provides generating automatons for receiving character strings, Burkhardt provides sort keys, record identifiers, order value tuples, and arranging records in either ascending or descending order, and Lee provides sort tables and predetermined orders of values in tables.

9. As per claim 7, the "...in said sort table generating step..." is taught by Lee at col. 8, line 38 and col. 10, lines 29-30, the "...sort order sort table..." is taught by Lee at col. 5, lines 61-64 and col. 8, line 38, and the "...on which order values are arranged in an ascending or descending order is generated..." is taught by Burkhard at col. 7, lines 54-57 and col. 9, lines 50-55.

10. As per claim 8, the "...in said sort table generating step..." is taught by Lee at col. 8, line 38 and col. 10, lines 29-30, the "...record order..." is taught by Burkhard at col. 7, lines 54-57, the "...sort table..." is taught by Lee at col. 8, line 38, and the "...on which record identifiers are arranged in an ascending or descending order is generated..." is taught by Burkhard at col. 7, lines 58-59 and col. 9, lines 50-55.

11. Claim 9 is rejected under 35 U.S.C. 103(a) as being unpatentable over Shimura, Burkhard, and Lee as applied to claim 8 above, and further in view of Amundsen (U.S. Patent No. 6,745,173).

As per claim 9, the "...there are a plurality of sort key items..." is taught by Burkhard at col. 9, lines 50-55, the "...and a record order..." is taught by Burkhard at col. 7, lines 54-57, the "...sort table..." is taught by Lee at col. 8, line 38, the "...is generated based on a plurality of order value tuples..." is taught by Burkhard at col. 7, lines 54-57 and col. 7, lines 20-22,

the "...which is a set of a plurality of order values..." is taught by Burkhard at col. 7, lines 54-57,

the "...and a record identifier..." is taught by Burkhard at col. 7, lines 58-59,

the "...automaton generating step of generating an automaton..." is taught by Shimura at col. 7, lines 45-50,

the "...for assuming that a row of a plurality of order values..." is taught by Burkhard at col. 7, lines 20-22 and col. 7, lines 54-57,

the "...of the record order..." is taught by Burkhard at col. 7, lines 54-57,

the "...sort table..." is taught by Lee at col. 8, line 38,

the "...is a character string..." is taught by Shimura at col. 7, lines 21-35,

the "...belonging to the record identifier..." is taught by Burkhard at col. 7, lines 58-59,

the "...and receiving the character string..." is taught by Shimura at col. 7, lines 21-35,

the "...as a plural order value..." is taught by Burkhard at col. 7, lines 54-57,

the "...key character string..." is taught by Shimura at col. 44, lines 63-66 and col. 7, lines 21-35,

the "...for all tuples on the record order..." is taught by Burkhard at col. 7, lines 20-22 and col. 7, lines 54-57,

the "...sort table..." is taught by Lee at col. 8, line 38,

the "...of scanning the automaton..." is taught by Shimura at col. 3, lines 66-68 and col. 4, lines 1-6,

the "...which is a set of the record-identifier..." is taught by Burkhard at col. 7, lines 58-59,

the "...for the plurality of sort keys..." is taught by Burkhard at col. 9, lines 50-55, but the "...and a general order value tuple generating step..." the "...and generating a general order value tuple..." and the "...and a newly ordered general order value as a general order..." are not taught by either Shimura, Burkhard, or Lee.

However, Amundsen teaches the use of general (or common) order tuples as follows:

"...In the context of two order 1 tensors T1, this would be a complete description of the steps for computing a join\_fanout were the tensors to have the same domains along their common order and have along that order, the same ordering of coordinates..." at col. 26, lines 15-19.

"...The UNION ALL operation operates upon two relations, and produces a relation having all tuples found in either relation, whether or not unique..." at col. 29, lines 24-26.

It would have been obvious to one of ordinary skill at the time of the invention to combine Amundsen with Shimura, Burkhard, and Lee to provide general order value tuples in order to provide for a universal sequential ordering of the records. Shimura, Burkhard, Lee, and Amundsen teach the use of related systems. They teach the use of computers, the use of databases, the sorting of data, the use of character strings, and the use of keys and Burkhard, Lee, and Amundsen teach the use of records. Shimura provides generating automata for receiving character strings, Burkhard provides sort keys, record identifiers, order value tuples, and arranging records in either ascending or descending order, Lee provides sort tables and predetermined orders of values in tables, and Amundsen provides common order value tuples.

12. Claim 11 is rejected under 35 U.S.C. 103(a) as being unpatentable over Shimura and Burkhard as applied to claim 1 above, and further in view of Lepage et al. (U.S. Patent No. 6,009,424).

As per claim 11, the "...of converting input sort key item data...," is taught by burkhard at col. 6, lines 23-25 and col. 9, lines 50-53, the "...into a key character string..." is taught by Shimura at col. 44, lines 63-66 and col. 7, lines 21-35, the "...appropriate for said automaton generating step..." is taught by Shimura at col. 7, lines 45-50, the "...according to a key condition relating to a sort method..." is taught by Burkhard at col. 7, lines 36-39 and col. 7, lines 66-67, the "...for each specified sort key item..." is taught by burkhard at col. 9, lines 50-55, but the "...a key data preprocessing step..." is not taught by either Shimura or Burkhard.

However, Lepage teaches the use preprocessing steps as follows:

"...FIGS. 2A, 2B, 2C and 2D are diagrams showing examples of tables that are formed by the preprocessing section 2 in connection with a search key "abcad" and stored in the unit position correspondence memory 10 in the similarity search apparatus shown in FIG. 1..." at col. 6, lines 19-24.

It would have been obvious to one of ordinary skill at the time of the invention to combine Lepage with Shimura and Burkhard to provide a key data preprocessing step in order to provide for converting the sort key character string into a standard format and expediting the sort process. Shimura, Burkhard, and Lepage teach the use of related

systems. They teach the use of computers, the use of databases, the use of character strings, and the use of keys and Burkhard and Lepage teach the use of records.

Shimura provides generating automatons for receiving character strings, Burkhard provides sort keys, record identifiers, order value tuples, and arranging records in either ascending or descending order, and LePage provides preprocessing steps on records.

### ***Response to Arguments***

13. Applicants' arguments filed 15 February 2005 have been fully considered but they are not persuasive. In the first argument for independent claim 1 on page 5, paragraph 5, the Applicants state:

"Burkhard discusses an improved radix sorting method. Burkhard does not discuss, much less teach or suggest, the use of an automaton to perform a sort. In addition, the Examiner does not provide an explanation or a rational concerning how Burkhard would be combined with Shimura. It is submitted that that they cannot be combined."

The Examiner disagrees. This action states that it would have been obvious to one of ordinary skill at the time of the invention to combine Burkhard with Shimura to provide sort keys and record identifiers in order to allow the keys of records to be sorted and to minimize the number of record reads for each record. Likewise, it would have been obvious to one of ordinary skill at the time of the invention to combine Burkhard with Shimura to provide order value tuples in order to provide increased flexibility in the definition of sort keys. Finally, it would have been obvious to one of ordinary skill at the time of the invention to combine Burkhard with Shimura to allow arranging records in either ascending or descending order in order to provide flexibility in the definition for sequential ordering of records and gain more user acceptability of the system. Shimura and Burkhard teach the use of related systems. Shimura teaches the use of sorted

range information at col. 29, lines 4-6. This suggests the sorting of records, which is taught by Burkhard. Shimura teaches the use of databases at col. 1, lines 50-54. Database features such as sort keys, record identifiers, and tuples are features of databases taught by Burkhard. The teaching of Shimura including the use of sorted information and the use of database suggests the use of these features, which is taught by Burkhard.

14. In the second argument for independent claim 1 on page 6, paragraph 1, the Applicants state:

"The radix sort of Burkhard improves over the prior art by not requiring that all of the variable length data strings/records to be sorted be converted into the same data type before they are sorted. That is, native data types of variable length are sorted. Because of this, the data to be sorted needs to be read in its native format and length each time a sort operation (a movement of the record in the record list) is performed using a sort plan that indicates how each bit in the record/string is to be treated. That is, each string/record in the list of strings/records to be sorted is read and examined numerous times. In contrast, by using an automaton, the present invention reads each record only once. That is, the present invention improves over the combination of Shimura and Burkhardt even if it is proper to combine Shimura and Burkhardt."

The Examiner disagrees. Applicant's arguments fail to comply with 37 CFR 1.111(b) because they amount to a general allegation that the claims define a patentable invention without specifically pointing out how the language of the claims patentably distinguishes them from the references. A more detailed description of a sort method in the Specification does not distinguish the proposed patent from prior art since only the text used in the limitations of a claim is used to determine whether the claim is rendered obvious by the prior art.

15. In the third argument for independent claim 1 on page 6, paragraph 2, the Applicants state:

"Lee, Amundsen and Lepage add nothing to Shimura and Burkhart with respect to using an automaton to perform sorting."

The Examiner disagrees. Since a combination of teachings from Shimura and Burkhart has already rendered obvious independent claim 1 as well as independent claims 2, 3, and 13, there is no requirement that either Lee, Amundsen, or LePage to contribute to the rejection of these independent claims.

16. In the fourth argument for the dependent claims on page 6, paragraph 4, the Applicants state:

"The dependent claims depend from the above-discussed independent claims and are patentable over the prior art for the reasons discussed above. The dependent claims also recite additional features not taught or suggested by the prior art. For example, claim 6 and 12 emphasize that the automaton uses an order table. The prior art does not teach or suggest such."

The Examiner disagrees. Lee teaches the use of a "sort encoding table" at col. 8, line 38. This suggests the use of a "sort table" as claimed in claims 6 and 12. Since the dependent claims all depend on independent claims, which have been rendered obvious by a combination of Shimura and Burkhart and the responses to the first two arguments and none of the dependent claims contain additional features not taught or suggested by the prior art, these dependent claims are also rendered obvious.

### ***Conclusion***

17. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

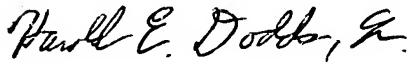
A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not

mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

18. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Harold E. Dodds, Jr. whose telephone number is (571)-272-4110. The examiner can normally be reached on Monday - Friday 8:00 - 4:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, John E. Breene can be reached on (571)-272-4107. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Harold E. Dodds, Jr.  
Patent Examiner  
May 3, 2005

  
Greta Robinson  
PRIMARY EXAMINER